WHAT IS CLAIMED IS:

1.      A computer-implemented method for decomposing images in a sequence of images representing a scene, the method comprising:

transforming images in a sequence of images into a log opponent color domain;

applying a plurality of filters to the transformed images to generate a plurality of sequences of filtered images, the plurality of filters including a derivative filter to be applied to produce a derivative in a first direction and a derivative filter to be applied to produce a derivative in a second direction, where the first and second directions are different directions;

calculating a median image for each of the plurality of sequences of filtered images; and

using the median images to calculate a reflectance image for the sequence of images, the reflectance image representing an image the application to which the plurality of filters would yield substantially the calculated median images for the sequences of filtered images.

2.      The method of claim 1, further comprising:

calculating a sequence of illumination images corresponding to the images in the sequence of images, such that each image in the sequence of images can be represented as the product of the reflectance image and an illumination image of the sequence of illumination images.

3.      The method of claim 2, further comprising:

modifying one or more of the reflectance image or the illumination images; and

combining the reflectance image and the illumination images, including the one or more modified images, to create a new sequence of images.

4.      The method of claim 2, further comprising:

modifying one or more of the reflectance image or the illumination images; and

using the reflectance and illumination images, including the modified image or images, to generate a new image.

5.      The method of claim 1, wherein:

applying the plurality of filters includes applying each of the plurality of filters to each of the luminance and chrominance channels of the opponent color space for each pixel in each image in the sequence of images.

6.      The method of claim 1, wherein:

calculating a reflectance image includes calculating a reflectance image having a minimum least squared error between the result of application of each of the plurality of filters to the reflectance image and the calculated median image for the corresponding sequence of filtered images.

7.      The method of claim 1, wherein:

applying a plurality of filters includes applying three or more filters to the transformed images.

8.      The method of claim 7, wherein:

the plurality of filters includes one or more derivative filters in addition to the derivative filter to be applied to produce a derivative in the first direction and the derivative filter to be applied to produce a derivative in the second direction, the additional derivative filters being applied to produce a derivative in one or more directions other than the first and second directions.

9.      The method of claim 7, wherein:

the plurality of filters includes filters operable to produce a derivative at a plurality of different frequencies.

10.     The method of claim 1, further comprising:

aligning the images prior to transforming the images.

11.     The method of claim 1, further comprising:

aligning the filtered images prior to calculating the median image.

12.     A computer-implemented method for decomposing images in a sequence of images representing a scene, the method comprising:

transforming images in a sequence of images into a log domain;

applying a plurality of filters to the transformed images in the sequence of images, the plurality of filters including a derivative filter to be applied to produce a derivative in a first direction, a derivative filter to be applied to produce a derivative in a second direction, where the first and second directions are different directions, and one or more additional filters;

calculating a median image for each of the plurality of sequences of filtered images; and

using the median images to calculate a reflectance image for the sequence of images, the reflectance image representing an image the application to which the plurality of filters would yield substantially the calculated median images for the sequences of filtered images.

13.     The method of claim 12, further comprising:

calculating a sequence of illumination images corresponding to the images in the sequence of images, such that each image in the sequence of images can be represented as the product of the reflectance image and an illumination image of the sequence of illumination images.

14.     The method of claim 13, further comprising:

modifying one or more of the reflectance image or the illumination images; and

combining the reflectance image and the illumination images, including the one or more modified images, to create a new sequence of images.

15.     The method of claim 13, further comprising:

modifying one or more of the reflectance image or the illumination images; and

using the reflectance and illumination images, including the modified image or images, to generate a new image.

16.     The method of claim 12, wherein:

calculating a reflectance image includes calculating a reflectance image having a minimum least squared error between the result of application of each of the plurality of filters to the reflectance image and the calculated median image for the corresponding sequence of filtered images.

17.     The method of claim 12, wherein:

the one or more additional filters include one or more derivative filters in addition to the derivative filter to be applied to produce a derivative in the first direction and the derivative filter to be applied in the second direction, the additional derivative filters being applied to produce a derivative in one or more directions other than the first and second directions.

18.     The method of claim 12, wherein:

the one or more additional filters include filters operable to produce a derivative at a plurality of different frequencies.

19.     The method of claim 12, further comprising:

aligning the images prior to transforming the images into the log domain.

20.     The method of claim 12, further comprising:

aligning the filtered images prior to calculating the median image.

21.     A computer program product embodied on an information carrier for decomposing images in a sequence of images representing a scene, the computer program product comprising instructions operable to cause a computer system to:

transform images in a sequence of images into a log opponent color domain;

apply a plurality of filters to the transformed images in the sequence of images, the plurality of filters including a derivative filter to be applied to produce a derivative in a first direction and a derivative filter to be applied to produce a derivative in a second direction, where the first and second directions are different directions;

calculate a plurality of median images, one for each sequence of filtered images; and

calculate a reflectance image for the sequence of images, the reflectance image representing an image the application to which the plurality of filters would yield substantially the calculated median image for the sequence of filtered images.

22.     The computer program product of claim 21, further comprising instructions operable to cause a computer system to:

calculate a sequence of illumination images corresponding to the images in the sequence of images, such that each image in the sequence of images can be represented as the product of the reflectance image and an illumination image of the sequence of illumination images.

23.     The computer program product of claim 22, further comprising instructions operable to cause a computer system to:

modify one or more of the reflectance image or the illumination images; and

combine the reflectance image and the illumination images, including the one or more modified images, to create a new sequence of images.

24.     The computer program product of claim 22, further comprising instructions operable to cause a computer system to:

modify one or more of the reflectance image or the illumination images; and

use the reflectance and illumination images, including the modified image or images, to generate a new image.

25. The computer program product of claim 21, wherein:

the instructions operable to cause a computer system to apply the plurality of filters include instructions operable to cause a computer system to apply each of the plurality of filters to each of the luminance and chrominance channels of the opponent color space for each pixel in each image in the sequence of images.

26. The computer program product of claim 21, wherein:

the instructions operable to cause a computer system to calculate a reflectance image include instructions operable to cause a computer system to calculate a reflectance image having a minimum least squared error between the result of application of the plurality of filters to the reflectance image and the calculated median image for the sequence of images.

27. The computer program product of claim 21, wherein:

the instructions operable to cause a computer system to apply a plurality of filters include instructions operable to cause a computer system to apply three or more filters to the images in the sequence of images.

28. The computer program product of claim 27, wherein:

the three or more filters include one or more derivative filters in addition to the derivative filters applied to produce a derivative in the first and second directions, the additional derivative filters being applied to produce a derivative in one or more directions other than the first and second directions.

29. The computer program product of claim 27, wherein:

the three or more filters include one or more filters operable to produce a derivative at a plurality of different frequencies.

30. The computer program product of claim 21, further comprising instructions operable to cause a computer system to:

align the images prior to transforming the images into the log opponent color domain.

31.     The computer program product of claim 21, further comprising instructions operable to cause a computer system to:

align the filtered images prior to calculating the median image.

32.     A computer program product embodied on an information carrier for decomposing images in a sequence of images representing a scene, the computer program product comprising instructions operable to cause a computer system to:

transform images in a sequence of images into a log domain;

apply a plurality of filters to the transformed images in the sequence of images, the plurality of filters including a derivative filter to be applied to produce a derivative in a first direction, a derivative filter to be applied to produce a derivative in a second direction, where the first and second directions are different directions, and one or more additional filters;

calculate a plurality of median images, one for each sequence of filtered images; and

calculate a reflectance image for the sequence of images, the reflectance image representing an image the application to which the plurality of filters would yield substantially the calculated median image for the sequence of filtered images.

33.     The product in claim 32, further comprising instructions operable to cause a computer system to:

calculate a sequence of illumination images corresponding to the images in the sequence of images, such that each image in the sequence of images can be represented as the product of the reflectance image and an illumination image of the sequence of illumination images.

34.     The computer program product of claim 33, further comprising instructions operable to cause a computer system to:

modify one or more of the reflectance image or the illumination images; and

combine the reflectance image and the illumination images, including the one or more modified images, to create a new sequence of images.

35.     The computer program product of claim 33, further comprising instructions operable to cause a computer system to:

        modify one or more of the reflectance image or the illumination images; and

        use the reflectance and illumination images, including the modified image or images, to generate a new image.

36.     The product in claim 32, wherein:

        the reflectance image has a minimum least squared error between the result of application of each of the plurality of filters to the reflectance image and the calculated median image for the corresponding sequence of filtered images.

37.     The computer program product of claim 32, wherein:

        the one or more additional filters include one or more derivative filters in addition to the derivative filters applied to produce derivatives in the first and second directions, the additional derivative filters being applied to produce derivatives in one or more directions other than the first and second directions.

38.     The computer program product of claim 32, wherein:

        the plurality of filters includes one or more filters operable to produce a derivative at a plurality of different frequencies.

39.     The computer program product of claim 32, further comprising instructions operable to cause a computer system to:

        align the images prior to transforming the images into the log domain.

40.     The computer program product of claim 32, further comprising instructions operable to cause a computer system to:

        align the images prior to calculating the median image.

41.     A method for extracting the constant reflectance component from a sequence of images of a natural scene comprising:

capturing a sequence of images of a scene;

aligning each of the images of the sequence of images;

transforming each of the images in the sequence of images into a log opponent color domain;

applying a plurality of filters to the images in the sequence of images, the plurality of filters including a derivative filter to be applied to produce a derivative in a first direction, a derivative filter to be applied to produce a derivative in a second direction, where the first and second directions are different directions, and one or more additional filters;

calculating a median image for each sequence of filtered images; and

calculating a reflectance image for the original sequence of images, the reflectance image having a minimum least squared error between the result of application of each of the plurality of filters to the reflectance image and the calculated median image for the corresponding sequence of filtered images.